

REMARKS

Claims 1-11 are pending in the instant application. Claim 8 is amended to clarify the subject matter recited therein and/or to correct typographic errors. No new matter is added by the amendment.

Applicants gratefully acknowledge that the Examiner has found claims 3-4, 8, and 11 to contain allowable subject matter.

Claims 1-2, 5-7, and 10 stand rejected under 35 U.S.C. § 102(b) as anticipated by United States Patent No. 5,495,471 to Chow et al. (hereinafter Chow). Applicants respectfully traverse.

Claim 1 is directed to a protecting route design method for a communication network including a plurality of nodes having preset information on a protecting route to switch over in parallel from a working route thereto when link or node failure occurs, according to a failure notification message including failure location information being transmitted from a failure detection node to each node. The protecting route design method includes searching a protecting route which can minimize a transfer time of the failure notification message from the failure detection node. The method according to claim 1 also includes updating the searched protecting route to a protecting route having a spare communication capacity sharable for a different failure and having a route switchover time to be completed within a given time limit.

As defined in claim 1, the subject matter of the claims relates to a network system, wherein a protecting route is set in advance in each of nodes forming a network. When a failure occurs, a node detecting the failure transfers a failure notice message including failure position information to other nodes, and a node receiving the failure notice message switches to the protecting route based on the failure position information. A feature of the claimed invention is that searching is performed to find the protecting route through which a transmission time is

minimized to transmit a failure notice message from the node detecting the failure to the other nodes. Further, the selection of a protecting route by each node and the updating of a protecting route information are performed so that a spare communication capacity is sharable for a failure other than the detected failure. Therefore, a protecting route can be set so that the spare communication capacity is minimized and switching to the protecting route is completed within the given limited time period. This feature is explained in more detail at least on page 15, line 4 to page 20, line 26 of the specification, and is also shown in figures 7 and 8.

In contrast, Chow apparently discloses that two nodes detect a failure broadcast “Black restoration message” and “Gray restoration message”, respectively. The broadcasted Black restoration message and the Gray restoration message coincide at a certain node, and the Black restoration message and the Gray restoration message are transferred back, but not broadcasted along a known route, through which the Black restoration message and the Gray restoration message have been transmitted. Thus, the selection of a protecting route and cross connection or pass switching is dynamically performed at the time a failure occurs.

Accordingly, what Chow apparently discloses is fundamentally different from the configuration of the present invention in that in the present invention a network management system (NMS) sets in advance the protection route information in each node, and at a failure, each node performs a path switching to a protecting node based on the protecting route information. Further, the method of searching a protecting route by “the shortest path heuristic” as disclosed in Chow is different from the method of the present invention based on the prediction of a transmission time period for a failure notice message by a transfer time model (*see* Chow, Figure 9) and the sharable spare communication capacity.

In the present invention, in the selection of a protecting route, the protecting route is formed by such a node as sharable of spare communication capacity at a failure different from the failure detected, so that the spare communication capacity is minimized. In contrast, Chow fails to indicate this feature of the present invention in the section cited by the Examiner (Chow; col. 14, lines 62-64).

Further, the present invention discloses the feature such that the path switching is performed within a certain limited time period, and the prediction of the time period during which a failure notice message is transmitted via the protecting route to each node is performed by using a transfer time model shown in figure 9. In contrast, this feature is not disclosed in Chow, which instead indicates “[i]deal is a 100% restoration within two seconds” on column 12, lines 28-29, but fails to suggest any method for selection of a protecting route within a limited time period.

As discussed above, in the present invention, an NMS sets in advance a protecting route for each failure so that the spare communication capacity is minimized, and switching to the protecting route is completed within a predetermined time period. The protecting route is set as a protecting route information, statically, and each node on the protecting route performs path switching based on the statically set, protecting route information at failure. On the other hand, in Chow, a protecting route is selected dynamically and path-switching is performed by broadcasting “Black restoration message” and “Gray restoration message” at the same time.

Accordingly, not only the basic configuration of the present invention is different from that of Chow, but also Chow fails to disclose the minimization of spare communication capacity and the selection of a protecting route within a limited time period as recited in claim 1. Therefore, for at least these reasons, claim 1 is allowable over the reference.

Claims 2, 5-7, and 10 are allowable based on their dependence on claim 1.

Claim 9 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Chow in view of United States Patent No. 6,289,096 to Suzuki et al. (hereinafter Suzuki). Applicants respectfully traverse.

Claim 9 depends from claim 1 and the addition of Suzuki fails to cure the deficiency discussed above with respect to Chow as applied against claim 1. Therefore, claim 9 is allowable for at least the same reasons as claim 1 is allowable.

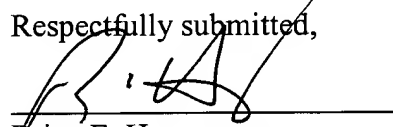
CONCLUSION

An earnest effort has been made to be fully responsive to the Examiner's objections. In view of the above amendments and remarks, it is believed that independent claim 1 is in condition for allowance, as well as those claims dependent therefrom. Passage of this case to allowance is earnestly solicited.

However, if for any reason the Examiner should consider this application not to be in condition for allowance, he is respectfully requested to telephone the undersigned attorney at the number listed below prior to issuing a further Action.

Any fee due with this paper, not fully covered by an enclosed check, may be charged on Deposit Account 50-1290.

Respectfully submitted,



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